

Acrylated palm oil nanoparticle synthesized by radiation-induced process as a controlled drug delivery system

ABSTRACT

The acrylated palm oil (APO) nanoparticle is a potential product that can be used as carriers in medical field. The main focus of the present study was to study the potential of the APO nanoparticles for used in a controlled drug delivery system. The microemulsion system is used as a medium to incorporate an active substance such as Thymoquinone (TQ) into the APO polymeric micelle and then the radiation technique is used as a tool for the synthesis of TQ-loaded APO nanoparticle. The nano-size TQ-loaded APO particles resulted the particle size of less than 150 nm with spherical in shape. The TQ release profile was carried out in potassium buffer saline (PBS) solutions (pH 7.4) at 37°C. And, the zero-order model has been used to determine the mechanism of the drug release from the corresponding nanoparticles, respectively. The TQ release was found to be sustained and controlled in pH 7.4. At pH 7.4, the release of TQ followed the zero-order model. The in-vitro drug release study showed a good prospect of the APO nanoparticle on being a potential drug carrier as there are toxic against colon cancer cells and not toxic towards normal cells. This suggested that the APO product produce using this radiation technique can be developed into different type of carrier systems for controlled drug release applications.

Keyword: Acrylated palm oil; Nanoparticles; Polymeric micelle; Radiation crosslinking; Thymoquinone